REMARKS

Claims 2-31, 35-41, 43, 44, and 48-57 are pending in the present application. Claims 9, 41, 45, and 47 have been canceled, without admission or prejudice. Claims 3, 54, 55, and 57 have been amended herein for clarification. No new matter has been entered.

Objections to the Specification

The CROSS-REFERENCE TO RELATED APPLICATIONS section on page 1 of the specification was objected for informalities, specifically for not including the updated status of the related application. Per Examiner's suggestions, the Applicants have amended this section as shown in the Amendment to the Specification provided above. As a result, Applicants respectfully assert that the objection is moot and should be withdrawn.

Objections to the Drawings

The Drawings were objected to under 37 CFR 1.84(p)(5) for failing to include labels in the drawings corresponding to the number labels in the description. Fig. 4 was objected to for failing to include faces 21 and 23, although they were referred to in the specification. As shown in the Amendments to the Specification, the replacement paragraph refers to faces 21 and 23 only in context of Fig. 2, and no longer refers to faces 21 and 23 in the context of Fig. 4, thus the objection of Fig. 4 should be withdrawn. Fig. 3 was objected to for failing to include labels 20, 21 and 23. Per examiner suggestion, these labels are now included in the attached replacement sheets, thus the objections of claim should be withdrawn. As a result, the objections to the drawings are respectfully traversed, and reconsideration is respectfully requested.

Objections to the Claims

Claim 3 was objected for mislabeling its dependency from claim 55 instead of claim 2. Pursuant to Examiner's suggestion, claim 3 has been amended to depend from claim 2, thus this objection should be withdrawn.

Claims 41 and 45 have been canceled, thus these objections should be withdrawn.

Claims 43 and 44 were objected to under 37 CFR 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicants respectfully submit that claim 43 does limit the scope of claim 57, from which it depends. Claim 43 recites, *inter alia*, "that respective cross-sectional dimensions of said relatively high and relatively low particle density regions vary inversely across a cross section of said porous diffusion media". This limitation of claim 43 narrows claim 57, because claim 57 recites vary and does not require the "vary inversely" limitation. As shown below, the specification demonstrates that the "vary inversely" is a specific embodiment not required in claim 57:

> As is illustrated in FIG. 2, certain applications may benefit from a configuration where the respective cross-sectional dimensions of the relatively high and relatively low particle density regions 26, 28 vary inversely across the cross section of the porous diffusion media 20 between the first and second major faces 21, 23 of the diffusion media 20. (page 6, lines 27-31).

Claims 2-31, 35-41, 55, and 56 are objected to, specifically for informalities in claim 55. Per examiner suggestion, the Applicants have amended claim 55 to remedy these informalities, thus the objections of claim 55 and claims 2-31, 35-41, and 56, which depend from claim 55, should be withdrawn. Accordingly, the objections are respectfully traversed, and reconsideration is respectfully requested.

Rejections under §112

Claims 9 and 17-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Claim 9 has been canceled without admission, thus the rejection is moot.

Claims 17-19 were rejected for use of the claim term "characteristic density value", thus the claims have been amended by striking out the word "characteristic". Claim 18 was also rejected for not including sufficient antecedent basis for the claim phrase "the next"; therefore, the phrase has been removed from claim 18. As a result, the rejections of claims 17-19 should be withdrawn.

Claims 20-23 were rejected for use of the claim terms "advancing contact angle" and "receding contact angle". As shown below, the specification clearly defines these terms and differentiates an advancing contact angle from a receding contact angle.

> In certain embodiments of the present invention, the high particle density regions 26 may be defined as being sufficiently hydrophilic to define an **advancing**

> **contact angle** of between about 135° and about 180° or, more particularly, between about 160° and about 168°, along one of the first and second major surfaces 21, 23 of the diffusion media 20. In terms of **receding contact angles**, the high particle density regions may be defined as being sufficiently hydrophilic to define a receding contact angle of between about 95° and about 135° or, more particularly, between about 95° and about 105°, along one of the first and second major surfaces 21, 23 of the diffusion media 20. (Page 7, lines 25-30 - Page 8, lines 1-2)

In light of the specification, the claim terms "advancing contact angle" and "receding contact angle" are described via ranges of angle values as well as locations related to the first or second major faces wherein the receding or advancing contact angles are present. Consequently, these claim terms are not indefinite, and the rejections of claim 20 through 23 should be withdrawn.

Accordingly, the rejections under §112 are respectfully traversed, and reconsideration is respectfully requested.

Rejections under §103

Claims 4-8, 10-13, 28, 29, 36, 37, 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dufner et al (US 6,024,848). Claims 24, 25, 30, 31 and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dufner et al in view of Taniguchi et al (EP 08272907). Claims 2, 3, 14-16, 20-23, 26, 27, 35, 43-45, 48-53 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dufner et al in view of Wood, III et al (US 6,350,539). Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wood, III et al in view of Dufner et al and Taniguchi et al. These rejections are respectfully traversed.

In order to establish a prima facie case of obviousness under §103, the Examiner has the burden of showing, by reasoning or evidence, that: 1) there is some suggestion or motivation, either in the references themselves or in the knowledge available in the art, to modify that reference's teachings; 2) there is a reasonable expectation on the part of one of ordinary skill in the art that the modification or combination has a reasonable expectation of success; and 3) the prior art references (or references when combined) teach or suggest all the claim limitations. *See* MPEP 2143.

Independent claims 54 and 57

Independent claims 54 and 57 both recite, *inter alia*, that: 1) said relatively high and relatively low particle density regions of water transfer particles alternate across a major planar dimension of said porous diffusion media parallel to first and second major faces of said diffusion media; 2) respective properties of the relatively high and relatively low particle density regions vary across a cross section of said porous diffusion media between said first and second major faces of said diffusion media such that said first major face is collectively more hydrophilic than said second major face and said second major face is collectively more hydrophobic than said first major face, and 3) the first major face and the second major face each comprise hydrophilic and hydrophobic portions. In the embodiment of Fig. 2, face 21 of the porous matrix 20 is collectively more hydrophilic than face 23, because face 21 comprises more high density regions 26 of water transfer particles. As you view the porous matrix 20 from left to right, you can clearly see the alternating high 26 and low 28 density regions across the planar dimension.

As a threshold, none of the references teach or suggest high and low density regions, respectively; however, the Examiner, using impermissible hindsight, states one of skill in the art would know to adjust the density of water particles in a porous matrix to achieve varied hydrophilic and hydrophobic regions in the porous matrix. Impermissible hindsight notwithstanding, the cited references, Wood III, Dufner, and Taniguchi, either singularly or in combination, fail to teach or suggest a porous matrix comprising this claimed arrangement. Our argument below will center solely on Wood and Dufner, since Taniguchi is not cited for its teachings of diffusion media configuration.

Referring to Fig. 2 of Wood, Wood teaches a three layer diffusion media comprising a bulk transfer layer 15, which constitutes an intermediate layer. The bulk transfer layer 15 separate the hydrophilic absorption layer 14 from the hydrophobic desorption layer 16 in diffusion media. In production of the diffusion media, the bulk transport layer 15 is used as a substrate for the absorption 14 and desorption 16 layers to engage. (Col. 3, lines 29-32). Because

Wood teaches separated hydrophilic and hydrophobic layers, Wood fails to teach high density regions (hydrophilic) and low density regions (hydrophobic) alternating across a major planar dimension as recited in claims 54 and 57 and as illustrated in Fig. 2. By failing to teach alternating regions across a cross section, Wood consequently fails to teach a configuration wherein varying across the cross section produces a collectively more hydrophilic first face, and a collectively more hydrophobic second face. Wood teaches a hydrophobic face and a hydrophilic face, but fails to teach that each face may comprise hydrophobic portions and hydrophilic portions as recited in claims 54 and 57 and as illustrated in Fig. 2. Wood teaches hydrophobic or hydrophilic sides, but does not teach that each side comprises both hydrophobic and hydrophilic portions.

Dufner is cited for teaching alternating hydrophobic and hydrophilic regions across a major planar dimension; however, Dufner fails to teach that one face is more hydrophobic and the other face is more hydrophilic. As shown in Fig. 2, the discrete hydrophobic and hydrophilic regions result in each face having equal amounts of hydrophobicity and hydrophilicity, not a porous matrix having a collectively more hydrophilic first face, and a collectively more hydrophobic second face.

Noting the deficiencies of Dufner and Wood, the Examiner combines the teachings of these references; however, the Examiner fails to provide a motivation to combine the teachings. The examiner states they both serve the same purpose, thus it would be obvious to combine the references. As stated in *In re Fritch*, "the mere fact that prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art **suggested the desirability of the modification**. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious." 23 USPQ2d 1780, 1783-4 (Fed. Cir. 1991). Wood and Dufner both serve the same purpose, i.e. water migration control; however, Dufner does not suggest some problem that Wood can solve, nor does Wood suggest a problem that Dufner can solve.

Furthermore, the Examiner assertion that Wood suggests a gradient of hydrophobic to hydrophilic would not succeed in modifying Dufner to produce the claimed configuration of claims 54 and 57. The gradient teaching is shown in Fig. 3 of Wood, wherein separate hydrophobic (desorption layer) 16 and hydrophilic (absorption layer) 14 layers are placed on opposite sides of a bulk transport layer 15. Modifying Dufner by placing separate hydrophobic and hydrophilic on opposite sides of the Dufner substrates 46 and 50 would render Dufner inoperable for its intended purpose. If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). In Dufner, the hydrophobic and hydrophilic regions of the substrate 46 and 50 are designed to be discrete or separate from one another, so that the Dufner apparatus can simultaneously control gas transfer and liquid transfer through the cell. By placing an absorption layer 14 and a desorption layer 16 on opposite faces of the substrates 46, the network of alternating hydrophilic and hydrophobic passageways would be blocked or impeded. By blocking the passageways, Dufner will be unable to satisfy its intended purpose of simultaneously controlling gas transfer and liquid transfer within the cell.

Assuming *arguendo* that Dufner is modified as suggested, the combination still would fail to teach all elements of the claim invention, because the sides of the substrate 46 and 50 would comprise all hydrophobic material or all hydrophilic material, but would not comprise both hydrophobic portions and hydrophilic portions as recited in claims 54 and 57 and as illustrated in Fig. 2. Consequently, the proposed combination of Wood, III, Dufner and Taniguchi fails to establish a prima facie case of obviousness.

None of the other cited references, singularly or in combination, cure the deficiencies of Wood, Dufner, and Taniguchi, thus the rejections under §103 should be removed. Independent claims 54 and 57, and all claims dependent thereon should be allowed.

Independent claims 54 and 55

Independent claims 54 and 55 recites, *inter alia*, 1) said relatively high and relatively low particle density regions of water transfer particles alternate across a major planar dimension of said porous diffusion media parallel to first and second major faces of said diffusion media; and 2) a hydrophobic material or layer disposed along said first or second major face.

As stated above, none of the references teach or suggest high and low density regions used to produce hydrophilic and hydrophobic regions, respectively; however, the Examiner, using impermissible hindsight, states one of skill in the art would know to adjust the density of water particles in a porous matrix to achieve varied hydrophilic and hydrophobic regions in the porous matrix. Impermissible hindsight notwithstanding, none of the references, either singularly or in combination, teach or suggest all elements of these claims.

As stated above, Dufner is cited for teaching alternating high and low density regions across a major planar dimension; however, as the Examiner acknowledges, Dufner fails to teach or suggest a layer of hydrophobic materials disposed along one of the major faces of the diffusion media. In the Background section, Dufner states it is known to treat support layers with hydrophobic substances, since it facilitates transport of gaseous reactants. Despite this teaching, Dufner does not utilize a hydrophobic layer in its apparatus as shown in Fig. 2. By inserting this hydrophobic layer into the Fig. 2 embodiment of Dufner, the layer would block the hydrophilic passages 52A-E or 56 A-E on at least one side of the hydrophilic passages. The Dufner reference uses this network of alternating hydrophobic and hydrophilic passages to simultaneously control gas transfer and liquid transfer through the cell. If the hydrophobic material is added, the hydrophilic passageways would be blocked and water transfer would be impeded. Consequently, modifying the Fig. 2 of Dufner to include the teachings in Dufner's Background regarding hydrophobic layers would render Dufner inoperable for its intended purpose. As a result, Dufner fails to teach a porous media having both alternating high and low density regions of water transfer particles an across a major planar dimension, AND a hydrophobic material or layer disposed along said first or second major face as recited in claims 54 and 55.

None of the other cited references, singularly or in combination, cure the deficiencies of Dufner, thus a case of prima facie obviousness has not been established. Accordingly, the rejections under §103 should be removed, and independent claims 54 and 55, and all claims dependent thereon should be allowed.

CONCLUSION

Accordingly, Applicants respectfully submit that all claims are in condition for allowance. The Examiner is encouraged to contact the undersigned to resolve efficiently any formal matters or to discuss any aspects of the application or of this response. Otherwise, early notification of allowable subject matter is respectfully requested.

Respectfully submitted,

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